FIELD EXPERIMENTS FOR COTNROL OF FIG ROOT BORER *BATOCERA RUFOMACULATA* DE GEER IN NORTH SINAI

G.N. GIRGIS, A.M. BATT, S.M. HAGGAG AND A.M. OKIL

Plant Protection Research Institute, Agicultural Research Centre, Dokki, Egypt.

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Abstract

The effect of some chemical and mechanical treatments on the reduction of the fig root borer Batocera rufomaculata was evaluated on fig trees in North Sinai Governorate during 1993-1995 seasons. Results obtained showed that injecting the larval tunnels with 5 ml. Cidial L 50/ liter kerosene, kerosene alone and gasoline gave good results. Painting the trunks with Stemex, Kerosene + Cidial L 50 (5 ml./liter), Kerosene, Lime, and Waste oil prevent the adults from attacking fig trees. The first two materials gave the highest results on reduction of egg deposition. Crushing the eggs had clear effect on the protection of fig trees compared with the untreated ones. Also, surrounding the trees with mosquito net had effective role on preventing the adult females from laying their eggs on the trees.

INTRODUCTION

Fig trees are widely distributed in North Sinai Governorate beside peach and olive plantations. Fig trees are very important owing to the increasing demand of their fruits for local consumption. The root borer Batocera rubus L. (Col. Cermbycidae) is mainly distributed in fig orchards in the north localities of Sinai e.g. (Rafah) (Alfieri 1976) in Egypt. Butani and Bajpai (1965) in India recorded this pest on mango trees. Denvis (1987) gave detailed description of B.rufomaculata De Geer. This pest causes serious damage to fig trees, where it lays the eggs on the main trunk

from 0 to 50 cm above the ground. The larvae bore their destructive tunnels in the root area causing their death through one or two years. The biology and ecology of B.rufomaculata was studied by Batt *et al.* (1996). Owing to the lack of control measures of this pest in Egypt, the aim of the present work is to evaluate the different mechanical and chemical means of control of B.rufomaculata. These means including, killing the larvae inside their tunnels by injecting some chemicals, painting the main trunk to prevent egg laying, crushing the laid eggs, and catching the adults by mosquito nets. These practices reduce the environmental pollution with insecticides, as well as magnifying the role of biological control agents.

MATERIALS AND METHODS

Experiments were carried out in 3 localities in North Sinai Governorate; Rafah El-Shekh Zowied and El-Arish, during Dec. 1993 to Dec. 1995. Two infested fig orchards were chosen in each locality . The following treatments were applied in each orchard :

1- Chemical treatments

a- Injection of tree trunks

Fourty eight infested trees were subjected for this treatment in El-Arish district. The materials used were : Kerosene, Gasoline and Kerosene + Cidial L50 % (the latter at a rate of 5 ml/L Kerosene). Each material was applied to 12 trees and 12 trees were left untreated. Injection was carried out once on March 1994 by using oilcan after erasing the outer layer of bark to discover the larval tunnels then injecting 40 ml of the material into the tunnel. Injected tunnels were inspected one month after the treatment. The same technique was repeated during 1995 on another 48 infested trees. The efficiency of the treatments was based according to the following percentage reduction of infestation formula .

% Reduction of infestation = C-T/C x 100, where C = the mean number of alive larvae in untreated trees, T = the mean number of alive larvae in the treated trees.

Statistical analysis was carried out according to "F" test and L.S.D (Fisher, 1950).

b- Painting tree trunks

An experiment was carried out at Rafah district where 60 uninfested trees were chosen (10 trees / material and 10 trees as untreated control). Based on the population dynamics of B.rufomaculata, painting treatment was applied early in May 1994 before adult emergence, to evaluate certain materials as preventive agents to females to deposit their eggs on tree trunks, or to reduce egg hatchability. The materials used were kerosene, Lime, Stemex, Waste oil and Cidial L 50 at the rate of 5 ml. per liter Kerosene. This painting was applied six times on 40-50 cm above the ground using a brush. Painting was applied from early May to late September at 4 weeks intervals. The same materials and technique were repeated in 1995 to another 60 uninfested trees. Trees were inspected every two weeks to estimate the insect success in laying their eggs and egg hatchability .

2- Mechanical treatments

a- Crushing eggs

Eggs of B.rufomaculata are very clear (5.9-6.2 mm long). Crushing the eggs was carried out after counting them at 4 day intervals (incubation period of eggs is 5-10 days) by using a piece of sackcloth from second half of May to first half of September 1995. This treatment was applied at El-Shekh Zowied district on 30 trees, while 5 trees were left untreated. The percentage reduction of infestation formula was used .

b- Catching adults

The adult of B.rufomaculata is big enough to be caught as it is 4.5-5cm long. Catching adults was carried out from late April to late September 1994 by covering the main trunks of fig trees with mosquito nets in order to hinder the adults from laying their eggs on the main trunks. This treatment was applied at El-Arish district on 15 fig trees and 5 trees were left untreated. The same experiment was repeated in 1995 on another 20 fig trees. Catching adults was practised at 2 week intervals, counting them and the deposited eggs was counted as well.

RESULTS AND DISCUSSION

A. Chemical treatment

1- Effect of injection

Data in Table 1 indicated that injecting the larval tunnels of B.rufomaculata

with Kerosene, Kerosene + Cidial L 50 and Gasoline reduced the larval population by 75.1, 82.0 and 67.8 % in 1994 and 85.3, 88.9 and 77.8% in 1995, respectively. Statistical analysis of data revealed that Kerosene + Cidial L 50 (5 ml of cidial / . kerosene) or Kerosene alone gave the highest percentage of reduction of infestation (75-89 %).

Table 1. Effect of injecting larval tunnels with different materials on *B.rufomaculata* larval population during 1994 and 1995 .

Materials	means No. of alive larvae		Percent reduction of larval population	
	94	95	94	95
Kerosene + Cidial	0.42 (a) (0-1)	0.25 (a) (1)	82.0 %	88.90%
Kerosene	0.58 (a) (1-2)	0.33 (a) (1)	75.1 %	85.3%
Gasoline	0.75 (b) (1-2)	0.5 (b) (1-2)	67.8%	77.8 %
untreated	2.33 (c) (1-5)	2.25 (c) (1-4)	-	-

2- Effect of painting treatment

As indicated in Table 2 the effect of painting with Stemex, Kerosene + Cidial L50, Kersoene, Lime and Wasteoil, resultd in reducing the number of bites which are mostly followed by egg laying. The percentages reduction of eggs deposition were 91.8, 87.2, 70.6, 59.6 and 23.8%, respectively in 1994, while in 1995 it was 90.3, 87, 67.5, 46.3 and 15.5%, respectively. Percentages of egg hatchability, however, were 33.3% 28.5%, 68.57%, 72.27% and 71.08% in 1994 and 41.66%, 31.25%, 67.5%, 69.69% and 72.11% in 1995, respectively. Statistical analysis of data revealed that using Stemex or cidial L 50 at rate of 5 ml. dissolved in Kerosene was more effective than the other materials, where they reduced the rate of infestation.

B- Mechanical treatment

1- Effect of crushing the eggs

Table (3) indicated that although this treatment is laborious, it showed very

Table 2. Effect of painting the trunk with different materials on the deposition of eggs and percentages of hatchability during 1994 and 1995 .

Materials	means No. of deposited eggs		Percentage reduction of eggs deposition		Percent reduction of larval population	
	1994	1995	1994	1995	1994	1995
Stemex	0.81 (a) (1-4)	1.09 (a) (1-3)	91.8 %	90.3 %	33.3 %	41.66 %
Kerosene + Cidial	1.27 (a) (1-4)	1.45 (a) (1-5)	87.2 %	87.0 %	28.5 %	31.25 %
Kerosene	2.91 (b) (1-8)	3.63 (b) (2-9)	70.6 %	67.5 %	68.57 %	67.50 %
Lime	4 (c) (1-9)	6 (c) (1-15)	59.6 %	46.3	72.27 %	69.69 %
Waste oil	7.54 (d) (5-20)	9.45 (d) (2-25)	23.8 %	15.5 %	71.08 %	72.11 %
untreated	9.9 (e) (1-30)	11.8 (e) (1-30)	--	--	74.3 %	77.23 %

Table 3. Effect of curshing the eggs of *B.rufomaculata* on percentage of hatchability during 1995 .

	No. of laid eggs	No. of hatchede eggs	percentages of hatchability
Treated	194	0	0 %
Untreated	65	46	71.76

effective percentage reduction of infestation. Crushing the eggs of B.rufomaculata completely prevent egg hatching as the percentage of hatchability reached 71.76% on untreated trees compared with 0% on treated ones.

2- Effect of catching the adults

Data in Table 4 indicated that the number of adults caught with mosquito nets was 3.87 and 2.93 beetles in 1994 and 1995, respectively, while no eggs were deposited on treated trees. On the other hand, untreated trees were attacked by the beetles and the number of deposited eggs were 77 and 65 in 1994 and 1995, respectively.

Table 4. Effect of catching the adult of *B.rufomaculata* by using mosquito net in the field during 1994 and 1995 .

Years	No. of adult catch per tree	No. of eggs laid on treated trees	Untreated trees
1994	3.87	0	77
1995	2.93	0	65

From the forementioned results it could be recommended that injecting the infested trees with 5 ml. Cidial L 50 in one liter of Kerosene, painting the trees with Stemex or 5 ml. Cidial L 50 in one liter Kerosene, crushing the eggs on trunks and catching the adults by nets gave adequate reduction in *B.rufomaculate* infestation.

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تجارب حقلية لمكافحة حفار جذور التين (باتوسيرا روفا ماكيولاتا) فى شمال سيناء

جورج نسيم ، عبد الغنى بط ، سعيد حجاج ، عادل عقيل

معهد بحوث وقاية النباتات – مركز البحوث الزراعية – الدقى .

نظرا للأهمية الإقتصادية لمحصول التين فى محافظة شمال سيناء وعملا على الحد من إستخدام المبيدات على هذا المحصول وحفاظا على البيئه من التلوث وتعظيم دور الأعداء الحيوية بالمنطقة تم مكافحة حفار جذور التين على الأشجار المصابة بواسطة حقن الإنفاق اليرقية بالكيروسين مخلوطا بالسيديال بمعدل ٥ سم للتر أو الكيروسين منفردا أو البنزين وتراوحت نسبة قتل اليرقات بين ٨٢٪ – ٧٥,١ ٪ – ٦٧,٨ ٪ فى عام ١٩٩٤، ٨٨,٩ ٪ – ٨٥,٨٪ – ٧٧,٣ ٪ فى عام ١٩٩٥ كما تمت اعمال الوقاية من الإصابة بدهان الجذع الرئيسى بعدة مواد ، حيث أعطت المعاملة بمادة إستيمكس أو الكيروسين و السيديال أعلى نسبة من الوقاية (أقل عدد من البيض) من ١ – ٥ بيضات كما كانت النسبة المئوية لفقس البيض أقل ما يمكن فى الأشجار المعاملة بهذه المواد حيث بلغت ٢٨,٥ ٪ فى حالة الدهان بالكيروسين والسيديال ، ٣٣,٣٪ فى حالة الدهان بمادة استيمكس فى عام ١٩٩٤ و فى عام ١٩٩٥ بلغت ٣١,٢٥ ٪، ٤١,٦٦ ٪ على التوالى كما كان لعملية هرس البيض تأثير واضح فى وقاية الأشجار من الإصابة حيث كانت نسبة الفقس (صفر) فى حين بلغت ٧١,٧٦٪ فى غير المعامل كما أن وضع شباك حول الأشجار كان له دور فعال فى الوقاية من الإصابة حيث لم تنجح الحشرات فى وضع البيض على الأشجار المحاطة بالشباك كما أن هذه العملية تعمل على تقليل تعداد الآفة فى المنطقة .